

TR 330

.M55

Copy 1

# HOW TO MAKE GOOD PRINTS

A Description of the Popular  
Contact Processes

TWELFTH THOUSAND  
WHOLLY REWRITTEN

PRICE, TEN CENTS

*American Photography*  
*Handbook No. 7*

American Photographic Publishing Co.  
BOSTON, MASS.

# *Special Lenses and Cameras for Portraiture*

in fact, everything in the photographic field, new or second hand, can be purchased to the best advantage of

## **Carmichael's Camera and Lens Exchange**

No bargain list published, but send us a letter stating just what you wish to buy, sell or exchange, and we will guarantee satisfaction.

**CARMICHAEL'S CAMERA  
AND LENS EXCHANGE**

**364 Washington Street, Room 2, Boston, Mass.**

*Miller, Malcolm Dean*

# HOW TO MAKE GOOD PRINTS

A Description of the Popular  
Contact Processes

---

TWELFTH THOUSAND  
WHOLLY REWRITTEN

Price, Ten Cents



*American Photography Handbook No. 7*

American Photographic Publishing Co.  
BOSTON, MASS.

TP 330  
M 55

Copyright 1914  
by  
American Photographic Publishing Co.

15-4408

0.10

DEC 24 1914 10

Set, printed and bound in the U. S. A.  
by the Sparrell Print, Boston, Mass.

©Cl. A 392316

201

## POPULAR PRINTING PROCESSES

**Importance of the Print.**—The words photograph and print are synonymous. The print is the end and aim of photography. By it your success or failure is judged, for the negative is simply an intermediate step, and a poor negative may be made to yield a good print by careful handling. The amateur who studies the different sorts of printing paper and learns their possibilities is in a position to make far better pictures than his careless brother who uses one printing medium for all his negatives. For instance, a marine may show to the best advantage on blueprint paper; a snow scene, on smooth platinum in clean bluish-black; a woodland view, on Velvet Green; and an autumn landscape on redeveloped gaslight or bromide paper in a beautiful warm sepia color. Again, a faulty negative, incapable of making a good printing-out paper proof, may produce a very satisfactory effect on one of the three grades of contrast in which gaslight papers are generally furnished. If only one sort of paper is used, the worker is obliged to attempt to make all

his negatives to fit the qualities of that paper; but as negatives vary, in spite of all our care, some will fail to print well on the one grade, and others must be resorted to.

**Degrees of Contrast.**—Some papers tend to reduce the contrasts of the negative, others to increase them. A hard negative succeeds well with one class and fails with the other, and vice versa. There is, however, a happy medium. A plate fully exposed and fully developed can be printed on almost any paper if the time of printing is correct. Beginners generally prefer a print which is brilliant rather than harmonious; but as their taste becomes educated, they avoid heavy, black, detail-less shadows and staring highlights and learn to print on softer papers so as to represent nature more as she looks to the eye. .

**Preparing the Negative.**—The first step in printing is to go over the negatives and correct any blemishes. Films and plates alike may need cleaning, for the wash-water generally leaves a film of dirt on them. Wiping the back of the film with a soft, dry cloth is sufficient. Glass plates should be cleaned and polished with Bon Ami or some other non-scratching scouring soap, or a mixture of alcohol and ammonia. An ounce each of 95 per cent alcohol and stronger ammonia water with two ounces of water is an efficient cleanser. It quickly removes traces of emulsion, which sometimes get on the back during the coating process.

**Spotting.**—The cleaned negative should now be laid face upward on a sheet of ground glass and examined by reflected light. A cheap retouching frame is convenient, but one can readily be improvised from a mirror and a sheet of ground glass supported by books at an angle of 45 degrees. Take a fine red sable spotting brush and some spotting colors and fill any transparent spots by touching the almost dry brush to them. A little practice soon teaches the knack; and, with care, the spot may be filled in so that little spotting of the print will be needed. Larger defects can be filled in with repeated touches of the brush. Highlights which are too dense can be rubbed down with a bit of chamois leather moistened with alcohol. Retouching is fully treated in the first Handbook of this series, "Retouching for Amateurs." The more time you spend in smoothing out defects, the easier it becomes to make good prints.

**Cleanliness.**—Cleanliness throughout is what makes the difference between good and bad photographic work. Trays, graduates, etc., should be rinsed both before and after use. At frequent intervals, remove traces of chemicals, stain, etc., by letting acid bichromate solution stand in them for a short time and then washing thoroughly. An ounce of potassium bichromate dissolved in a pint of water and acidified with strong sulphuric acid should be kept in a safe place ready for use. It keeps indefinitely and can be used over and over.

**Stamped steel trays** enameled white or white porcelain trays are easiest to keep clean, as they show dirt at once.

**Care of the Hands.**— The hands should be washed with soap and warm water before beginning work, taking pains to rinse off all traces of soap. Do not use soap in the darkroom, however, as it may get into the utensils and cause trouble. If the skin is liable to irritation from chemicals, rub a little lanoline thoroughly into the fingers and wipe off surface grease before beginning work.

**Light for Printing.**— Daylight is too uncertain in its strength to be quite practical for printing. Sudden changes in intensity may take place without being noticed by the eye until the loss of a print shows that the light has altered. It is far better always to use artificial light. The form of the light is, of course, governed by circumstances. An oil lamp is good, but slow; and many workers are so situated that they must depend on oil. The open gas flame is out of date, the Welsbach burner being far more powerful and in all cases to be preferred. Mazda bulbs are excellent when electric current is available. The electric arc is sometimes used, but there are many objections to it, not the least of which is its flicker.

A far more practical light of the utmost power is the Cooper Hewitt. This familiar blue-green light is photographically most valuable, as its rays affect sensitive materials very strongly and it is therefore



extremely fast. For instance, an unscreened tube prints in  $\frac{1}{2}$  second as compared with 5 to 15 seconds for incandescent bulbs. The best way to use a tube is to enclose it in a printing box with ground glass and shutter.

This light is suitable also for printing-out papers of all kinds, including platinotype, satista, P.O.P., and others. In fact, some of the largest producers of prints depend exclusively on this light in preference to daylight, as the cost of installation and current is soon saved by the absence of wasted paper. On a large scale, a Cooper Hewitt Quartz lamp can be utilized to operate a printing cabinet. The steadiness of the light is perhaps its greatest recommendation.

## PRINTING-OUT PAPERS

Papers which give a visible image by direct printing are called printing-out papers (P.O.P.) because the picture prints right out in plain sight. They are used in direct sunlight or diffused daylight, as only the strongest artificial lights (arc and Cooper Hewitt) are powerful enough to affect them in a reasonable time. The popular papers of this class are blueprint, gelatine P.O.P., gelatine and collodion self-toning P.O.P., and homemade salted paper. Platinum and satista are semi-printing out, as they give a visible but faint image which has to be developed to reach full strength. It is convenient to consider all of these together before taking up the

developing-out papers (D.O.P.) grouped under the names of gaslight and bromide papers.

**Blueprint.**—Salts of iron, sensitive to light, are spread on plain paper to give blue prints on a white ground. On exposure under a negative, the originally yellowish-green surface becomes darkened, until finally the deepest shadows present a bronzed appearance. When this stage has been reached, the middle tones and some of the details in the lights are visible, and the print is finished. It is now placed in clean running water, in which it instantly turns a bright blue; but the washing must be continued for twenty minutes to half an hour to insure permanence. The slightest trace of soap is fatal to a blueprint, so the process should not be carried out in a wash-bowl. Washing, drying, and mounting complete the process.

The paper is sold in tin cans or can be cheaply prepared by the user with any good quality of plain paper. The keeping quality is not great. Stale paper yields only dull, foggy prints. Moisture is the greatest enemy of the process. It is important to keep unused paper in the can, removing a sheet at a time when needed.

**Negatives.**—The type of negative best suited for blueprinting is one which has clear glass shadows without much detail and dense highlights—in other words, the typical snapshot which has been fully developed. Thin, weak negatives will not make satisfactory prints by this process.

**Printing.**— Underprinted paper washes out weak and light. Overtimed prints are too dark. The best guide to correct printing is not the bronzing of the shadows, which may take place early, but the appearance of the first traces of detail in the highlights.

**Making Blue Paper.**— A suitable formula for making one's own paper is:

A.— Ferric-ammonium citrate (green scales) ..	110 grains
Water .....	1 ounce
B.— Potassium ferricyanide .....	40 grains
Water .....	1 ounce

Mix equal parts and keep in a yellow glass bottle in the dark. Filter just before use. Apply to the paper (pinned to a drawing board) with a tuft of cotton, brushing in both directions until evenly moistened. Dry the paper in the dark and use as soon as bone dry. Brighter blue tones are obtainable by treating the prints with a  $2\frac{1}{2}$  per cent solution of alum, a 3 per cent solution of oxalic acid, or a 1 per cent bath of hydrochloric acid. The same formula can be used for sensitizing cloth. Proceed as follows:

**Blue Cloth.**— Select a good quality of linen, muslin, mercerized cotton, or other suitable white fabric and wash thoroughly to free it from size. When dry, immerse for one minute in the sensitizer, wring out, and hang up to dry.

**Toning.**— The color of blueprints can be altered, but the results are uncertain and not very permanent. Blue-gray and purple tones are obtained by

treating the print in water containing 10 minims of ammonia water to the pint. As soon as the desired color is reached, bathe in a bath of alum, 120 grains; water, 16 ounces. Finally wash in running water for half an hour. Brown to black tones are secured by bleaching the print in stronger ammonia solution, about 1 ounce to the pint of water, and treated with a saturated solution of gallic acid, in which the image reappears. Wash well and dry between blotters.

**Transparencies.**—Blue transparencies can be made by using the same sensitizer on a bleached negative. The silver is dissolved out of the gelatine by treating the waste negative with a strong Farmer's reducer.

Water to.....	4 ounces
Potassium ferricyanide.....	120 grains
Hypo.....	120 grains

After the image has wholly vanished, wash the cleared plate for at least two hours in running water and immerse for several minutes in the sensitizer. When dry, the plate is ready for printing under the negative in daylight. Light-struck plates can be cleared in plain hypo and used for this process instead of being wasted.

Owing to their cheapness and the attractive color, blueprints are very popular in spite of their lack of gradation. Good negatives are better suited to a medium which will bring out more differences between the middle tones as one sees them in the negative.

**Self-toning P.O.P.**— Second only to blueprint in simplicity of working is self-toning paper. It comes in two varieties, gelatine and collodion. Both contain the necessary gold to produce a fine brown or sepia tone when the prints are fixed in a weak hypo bath, with or without a pinch of baking soda. When properly fixed and washed, these papers are permanent.

Self-toning papers are sold in a large variety of surfaces both single and double weight, and post-cards. The lighter stock sometimes causes trouble by curling, particularly with collodion papers.

**Printing.**— The paper is printed with the coated side in contact with the dull side of the negative in direct sunlight or diffused daylight until it is one or two shades darker than required in the finished print. A negative fully exposed and fully developed is most suitable. The negative must be perfectly clean and free from dust. The paper may be dusted, but if it is taken from the package by its edges and shaken, with extreme care not to touch its coated side, dusting with a brush is better omitted. To secure sharp contact, it is well to use a felt pad or a sheet of rubber cloth backed with pieces of newspaper to supplement the springs of the printing frame. In humid weather, dry the felt pad in the oven before using.

If the print must show the full size of the negative, use a frame at least one size larger and provide it with a stout sheet of clear glass. Center the nega-

tive on the larger sheet and thus avoid the shading of the edges which may take place in a small frame. Put the frame out to print where no shadow from branches, etc., can fall on it at any time during the printing. There is a superstition that thin negatives should be printed in the shade but facing the sky; but this is not at all necessary if printing is not overdone. Another old idea was to print under ground glass or several thicknesses of the special onion-skin tissue paper sold by photographic supply dealers. The truth seems to be that these precautions simply help the operator to get his prints off in time when handling a large number of frames at once. If, however, greater contrast is required, it can be secured by fitting the frame with a sheet of green glass. Signal green or cathedral green are two of the suitable colors. In the same way, a harsh negative can be made to yield a softer print by using blue glass.

**Examining.**—As the prints gain in strength, open half of the frame in dull daylight well away from the window and examine the print. It takes only a few minutes in good light to get a “pretty” picture from an average negative. This is called the proof stage, as it is then that professional photographers take off their proofs (and, incidentally, put their fingers on them to cause marks and prevent dishonest amateurs from trying to tone and keep their proofs); but it is not dark enough for toning. Fasten the back and continue printing until the



whole image looks decidedly dark. As the prints come off, they should be stored face to face in a spare box until all are ready for toning. They may even be kept overnight, but most workers prefer to tone at once.

**Flattening.**— Collodion papers may need to be flattened by immersing them one by one face down in a smooth-bottomed tray containing a very little water. As soon as all are in, drain off the water and let the tray stand in a slanting position for ten minutes before toning. Some makes of paper require several changes of clear water or a salt bath to remove free silver; but most self-toning papers can be put directly into a bath composed as follows:

Water to make.....	20 ounces
Hypo.....	2 ounces
Temperature for use.....	60 to 70 degrees

A pinch of baking soda added to this bath will prevent sulphur toning.

**Fixing.**— The fixer should be used in a large tray, for instance, a 5 x 8 tray for 4 x 5 prints. Use enough hypo to fill the tray to a depth of half an inch. Take a print and immerse it face down, turning it over immediately to insure even action. Now immerse the second print and bring it into contact with the first, **back to back**. Continue in this way until all the prints are in, and then handle them in pairs by their edges, keeping them constantly on the move during the whole time of toning. If they are allowed to mat together, stains and streaks are sure

to result, either at the time or later. To insure permanency, it is best to allow only half a dozen 4 x 5 prints or their equivalent to each ounce of dry hypo. The time of toning is generally about ten minutes at the temperatures mentioned above.

**Dodging.**— The control of the color or tone with this kind of paper is very limited. As a rule, thin, quick-printing negatives do not give so rich a sepia as slightly more contrasty ones. The user, notwithstanding, is cautioned not to conceive an exaggerated idea of the contrast needed in the negative. Overdeveloped negatives may need to be printed with tissue pasted over the frame and worked on with powdered Prussian blue to hold back the shadows or turpentine to make the paper translucent over the dense highlights. Shadows can also be held back by working on the glass of the negative with a negative-marking pencil or flowing the plate with ground-glass substitute, plain or tinted, and scraping it away from the portions one wishes to print more deeply. An expert professional printer, by taking advantage of all these and other dodges, can turn out splendid prints from very faulty negatives. The amateur is reminded that such means of improving his results are most easily carried out with printing-out papers, as their effect can be watched. Local shading during printing can easily be effected by tearing a piece of cardboard roughly to the desired shape and tacking it to the frame. Raise the free edge about an inch from the negative



to avoid printing a sharp line and put the frame out in the shade. After a few trials, one becomes expert in this sort of work and can modify results in an astonishing manner without running the risk of spoiling the negative by attempting intensification or reduction.

**Blue Tones.**—Colder tones, tending to blue, can be had on self-toning paper by printing more deeply and giving the prints a preliminary bath of common salt, say a heaping teaspoonful to a pint of water. Strong negatives are needed. Self-toning paper, however, does not require quite so brilliant or “plucky” a negative as the old variety of P.O.P.

**Washing.**—Washing of the prints should be performed by transferring them one by one from tray to tray of clear water, allowing twelve five-minute changes. If the prints are washed in running water, make sure that it does not strike the prints forcibly, or it will blister them. Temperature is very important, even in washing, and all manipulations should, if possible, take place between 60 and 70 degrees at all seasons.

**Drying.**—The washed prints should be dried face up on clean blotters. Collodion prints can be dried between blotters or even over a source of heat, but gelatine papers cannot stand such treatment.

**Ferrotyping.**—Glossy prints are given a very high polish by the use of squeegee or ferrotype plates. It is essential to dry the prints and rewet before squeegeeing, or they may stick to the plates. The

plates are coated with a japan or enamel and should be well washed and then rubbed over with a solution of beeswax or paraffin wax in benzol or turpentine. A few drops are sprinkled on, rubbed all around with a soft cloth free from lint, and the final polish given with a silk cloth or chamois leather. A good formula is:

Beeswax.....	20 grains
Turpentine .....	1 ounce

When the plates are ready, immerse them in water and bring the prints into contact with them under water. Remove together, and squeegee the print into contact, using a flat rubber squeegee from the center toward the corners. Set the plates in a moderately warm place to dry. Do not attempt to strip off the prints until bone dry, or they will surely stick and tear. The tip of a penknife blade inserted under one corner will cause the print to spring off when it is quite dry. The chief cause of prints sticking is failure to dry them and rewet before putting them on the plates.

**Matt Prints.**— Prints can be given a matt surface by squeegeeing to ground glass, of course without any wax. As, however, matt and even rough and linen-surfaced papers are now furnished in self-toning brands, such a course is seldom necessary.

**Mounting.**— Squeegeed prints must be mounted dry, using dry mounting tissue, a gelatine mountant, or hinge tape.

Wet mounting is carried on in the usual way. Stack all the prints on a sheet of glass. Brush over the top one with a good paste on a rubberset bristle brush. Lift the print, turn it over, and lower it into place on the mount, holding it in a U shape so that the middle comes into contact first and lowering the ends so that air will be expelled. Success in making the print stick will be easy if the paste has been worked into the print until it becomes tacky and makes the brush drag and the edges and corners are well pasted. When the print is correctly placed on the mount — an Ingento Centering Square is invaluable here — lay a piece of clean lintless photographic blotter on it and roll with a good roller squeegee.

**Curling.**— To prevent curling of the mount, paste a piece of paper the same size on the back of the mount. Another way is to dry the mounted prints under pressure.

Prints can be mounted on cheesecloth by pasting them while on the ferrotype plates and rubbing the cloth into contact, leaving both until dry. In this case, they should not be trimmed until after mounting. Single-weight paper can also be backed with a sheet of the same weight prepared for the purpose under the name of backing paper. The coating of the second sheet counteracts the curl of the first. Double-weight paper, however, will stay flat enough without such precautions.

**P.O.P.**—The older form of printing-out paper contained no gold, but had to be washed, toned in an alkaline gold bath, and fixed separately. A modification of the process, a “combined” toning and fixing bath, may be mentioned only to condemn it. Prints put through such a treatment almost invariably fade in a short time.

**Stock Solutions.**—Precise directions are given with each make of P.O.P., yet all will work satisfactorily if the following plan is adopted, as toning can take place even in artificial light. The solutions required are a 10 per cent solution of ammonium sulphocyanide, a 10 per cent solution of common salt, a 10 per cent solution of hypo, and a gold bath containing 1 grain of gold chloride in each dram of water. The principle is to use a definite weight of gold for a given number of square inches of paper and to leave the prints in the bath until all of the gold has been used up.

**Toning Bath.**—The toning bath is made up as follows:—Measure out 10 ounces of water and add 2 drams of sulphocyanide solution and 1 ounce of salt solution. Mix, and add 1 dram of the solution of gold chloride. Label the bottle “Gold Toning Bath.” Each ounce of this bath contains 1-10 grain of gold, which is sufficient for two  $3\frac{1}{4} \times 4\frac{1}{4}$  prints. For warm brown tones, half to three quarters of an ounce is enough; for blue tones, a little more may be needed. Other sizes may be readily handled by taking more or less bath for each print.

**Toning.**—Now suppose that you have ten  $3\frac{1}{4} \times 4\frac{1}{4}$  prints to tone. Measure out five ounces of toning bath and put the prints directly into it without previous washing, handling them in pairs back to back. Continue to handle them in the bath until no further change of color can be seen. The final stage is when the surface looks cold and slaty-blue.

**Finishing.**—Washing, fixing, and finishing are the same as already described for self-toning paper. Eight to ten minutes is ample time for fixing, and the prints should not be left lying in the hypo any longer or they will bleach.

The advantage of this method is that one can always duplicate a desired tone if notes are kept of the exact amount of toning bath used for a print of a certain size to produce a given color.

**Instantaneous Toning.**—Another certain method of securing uniform tones is the so-called instantaneous toning bath. Four stock solutions are needed.

A.—Ammonium sulphocyanide.....	1 ounce
Water to make.....	10 ounces
B.—Gold chloride.....	15 grains
Water to make.....	$7\frac{1}{2}$ ounces
C.—Sodium phosphate.....	1 ounce
Water to make.....	10 ounces
D.—Saturated solution of borax.	

Mix, for toning ten  $4 \times 5$  prints:

A.....	1 dram
Water.....	8 drams
B.....	4 drams
C.....	1 dram
D.....	2 drams

The prints, which should be only one shade darker than desired, are put directly into the toning bath without previous washing. On entering the bath, the prints turn red, but within half a minute they assume a beautiful dark purple tone, almost black in the deepest shadows. No matter how much longer they are left in, they will not change again. As soon as the prints have assumed a uniform color, they may be fixed, or, if preferred, transferred to a tray of clear water until the entire batch is ready for fixing.

**Brush Toning.**— This method of toning, like the preceding, uses up every particle of gold in the bath. It is therefore highly important to measure out the right quantity for the number of prints to be toned. For instance, to tone four 4 x 5 or two 5 x 7 prints, measure out 15 minims of sulphocyanide, 120 minims of water, 60 minims of gold, and so on. To use such a small quantity to the best advantage, it is a good plan to lay the print face up on a clean sheet of glass and brush the toner over it with a tuft of cotton or a rubberset camel's hair brush, letting the surplus drip into a graduate. No matter how streaky the prints look at first, if the brushing is continued they will tone evenly and stop. Apparently they quickly absorb all the gold they are capable of taking up and thereby reach a very high degree of permanency. Prints toned in this manner have been exposed, half covered, to direct sunlight for three months without showing any dividing line.

**Keeping Quality.**— The stock solutions keep indefinitely, particularly if made up with distilled water and stored in yellow glass bottles in a cool, dark place. The mixed bath will not keep more than an hour.

**Economy.**— Users of this method can easily calculate the exact quantity of each stock required for



toning a print of a given size, check the figures by trial, and draw up a table showing how much to take for any number of prints. No gold is wasted, so it is extremely economical. It is simpler than other methods, as it requires no judgment. Still, if the P.O.P. worker prefers, he can follow the plan of using a bath of the strength advised by the maker of the paper and toning until the print has a particular color when looked through toward a window. The objection to this way is that prints are seldom uniform, as the strength of the light has a great deal to do with one's estimate of color. The instantaneous method can be worked at night. For instance, one can print in the morning before going to business, store the prints in a light-tight box, and finish them in the evening.

Many readers of *American Photography* have written to the Editor that they have tried the instantaneous toner and found it to work perfectly. Beginners are earnestly advised to do their toning by one or the other of the two methods just given until they become expert. Then, if they desire to secure other tones, they can experiment with different toning formulas, but we hope that no one will be unwise enough to use the combined toning and fixing bath and expect the prints to last. Remember that P.O.P. is permanent only if fixed as directed and then washed until the last trace of hypo is removed.

**Homemade Silver Papers.**—The amateur can sensitize pure paper of good quality, either rough or smooth, by "salting" it and afterward sensitizing it by floating on a solution of silver nitrate. Any of the drawing papers sold by dealers in artists' materials is satisfactory. A simple salting bath is:

Ammonium chloride.....	100 grains
Gelatine.....	10 grains
Water to.....	10 ounces

Swell the gelatine in a little cold water and dissolve it by warming gently in a water bath. Then add the chloride and make up to the required volume. The solution must be filtered into a chemically clean porcelain tray and the paper floated on it for three minutes, then dried in a warm, dark room while suspended by a clip from a line. The knack of floating the paper so as to avoid air bubbles is easily acquired if one holds the sheet in a U shape and lowers the loop until it touches, afterward lowering first one and then the other limb of the U.

**Sensitizing.**—The dried salted paper keeps indefinitely. When some is required for use, it is floated for a minute or two (depending on the roughness of the paper) on a bath containing 45 grains of chemically pure silver nitrate to each ounce of distilled water. Drying should be rapid, say overnight in a warm, dark room.

**Printing.**—The paper is printed in the same manner as bought P.O.P., only somewhat deeper, as the image tends to “sink in” on account of there being no waterproof coating under the sensitive layer.

**Toning.**—Toning for warm sepias is in a gold bath. Blacker tones can be obtained in a platinum bath, as follows:

Potassium chlorplatinite.....	4½ grains
Water.....	10 ounces
Nitric acid.....	2 to 3 drops

**Albumen Paper.**—The old-fashioned glossy albumenized paper can be obtained from some large dealers and sensitized by the user. Lately there has been a revival of interest in this old process, and several manufacturers have placed on the market ready sensitized matt albumen papers. Those who are interested can obtain information from their dealer. Albumen is undoubtedly more permanent than gelatine P.O.P., when properly handled, as



the many bright prints dating from Civil War times show.

**Platinum Paper.**—The high cost of platinum naturally prevents a popular use of this printing medium, yet it is one of the most beautiful of all processes and the image is more permanent than the paper on which it is supported. The color is a clear, beautiful blue-black to warm black. The paper has no gloss, hence the effect is just as artistic as a drawing in pencil or charcoal. Although the worker can make his own platinum paper, it costs him two or three times as much as it does to buy it ready for use.

Platinum paper is sold in tin cans containing a lump of preservative, which is necessary to prevent the paper from absorbing moisture and spoiling. When fresh, the paper is bright yellow on the sensitive side. It is printed in daylight, with every precaution to exclude moisture, preferably by means of a sheet of rubber cloth behind the paper.

**Printing.**—As the paper is extremely rapid, progress must be noted at frequent intervals. The paper must be examined in very weak daylight. The image appears gray on a yellow ground. After a few trials, it is easy to judge correct printing. The first traces of detail should just begin to show faintly under the denser portions of the negative, which is preferably rather bright though not extremely contrasty. An amount of clearness of the shadows which would be too much on the clear-glass order for most papers is not objectionable for platinum printing. A negative with foggy or veiled shadows is not at all suitable. Full exposure and full development are the requisites. From such a negative, platinum will yield a print the delicate gradations of which cannot be surpassed by any printing process whatsoever.

**Developing and Clearing.**— The finished print is put directly into a strong bath of potassium oxalate, in which the image at once flashes up full strength, though it does no harm to leave the print in for a longer time. From the developer, it is transferred to an acid bath, 1 ounce of chemically pure hydrochloric acid to 60 ounces of water. In this it remains five minutes, going afterward into two fresh acid baths for the same period. A short wash in running water completes the process.

**Sepia Paper.**— Platinum paper is also made in sepia, generally developed in a hot bath, though cold-bath sepia papers are obtainable. Of late years, the demand has been for warm tones, so the characteristic blue-black is harder to obtain. Papers of harder surface are also furnished under the name of Japine.

**Satista.**— The inventor of platinotype, Mr. Willis, has lately brought out a paper of the platinum class containing this metal and silver. The price is only about a third that of the regular platinum paper and the results can hardly be distinguished from it except by chemical tests. The tones obtainable are black, warm black, and sepia. The paper stock, like platinotype, is free from emulsion, so that it gives the same refined, artistic effects.

**Rapidity of Printing.**— Satista is extremely rapid, about five times as fast as P.O.P., and in bright light one can attend to only two to four frames at a time. The image appears gray on a yellow ground. Printing is done when shadows and middle tones have made their appearance. Overprinting gives dark, muddy prints. The paper is not very sensitive to damp, so it can be stored after printing if it is not convenient to finish the operations at once.

**Developing.**— Development takes place in the following bath:

Hot water.....	32 ounces
Potassium oxalate.....	8 ounces
Oxalic acid.....	100 grains

To be used at not less than 60 degrees Fahrenheit. The image flashes up to full strength, but the print should not be taken out until 30 seconds have elapsed. Then it is plunged at once into a clearing bath.

### Clearing.—

Warm water.....	80 ounces
Potassium binoxalate (salts of sorrel).....	1 ½ ounces

Two ten-minute changes of this are needed, the prints being moved around several times in each bath. The second bath should remain colorless; if it yellows, use a fresh portion.

**Rinsing.**— After the clearing the prints should be washed in running water for not less than eight nor more than ten minutes. The correct time is extremely important, as too brief a washing will not remove the clearing salt and too prolonged action may produce stain.

**Fixing.**— The silver remaining in the paper has now to be removed by fixing in a 10 per cent plain hypo for about 15 minutes. It is important to keep the prints moving to insure even action.

**Washing.**— The final washing should take not less than 40 minutes in running water, again seeing that the prints are kept well separated.

As satista has no gelatine or collodion emulsion, it dries flat and stays flat. Its high permanency, low price, and high artistic quality should make it one of the most popular of all processes among those who have time for daylight printing.

## DEVELOPING-OUT PAPERS

In marked contrast to the papers already spoken of is the class of developing-out papers (D.O.P.). It includes "gaslight" and bromide papers. The line dividing these kinds is not very definite, as some papers may be called either a fast gaslight or a slow bromide variety. The chief distinction is in speed. Bromide papers are of almost as great speed as the very slowest plates. White light of any kind spoils them instantly; but orange light is perfectly safe. Any source of artificial light can be used in the darkroom if orange fabric or postoffice paper is used and the least trace of white light is excluded. The light should be tested for safety in the same way one would test a ruby light for plates, that is, by exposing a piece of the dry paper half covered with black paper for about two minutes in the place where developing is usually done. Two minutes' development should not cause any darkening of the exposed portion, if the developer contains enough bromide to prevent fog, so if it darkens, use another thickness of orange fabric or postoffice paper over the light. Other points which distinguish a true bromide paper are its wide range of tones from a pure but not heavy black to a clear white—in other words, its great range of gradations—the relatively weak developer required, and the slowness of development. A properly timed image appears in 45 seconds to 1 minute and is not completely developed until two minutes have elapsed.

**Characteristics of Gaslight Papers.**—Gaslight papers, though some of them must be handled in orange light to prevent fogging or lead-colored whites, develop much more rapidly than bromide paper, and most of them have a much shorter range

of gradation, with a more solid black in the deep shadows. They come in several grades of contrast, making them suitable for all types of negatives. Contrast papers are suited to thin negatives — too thin to print on anything else; normal papers, to good negatives of average contrast; soft papers, to the more brilliant, contrasty negatives which yield the best prints on P.O.P. By using the different grades, the worker can make his prints as brilliant or as harmonious as he chooses.

Most gaslight papers can be printed by any strong artificial light and developed at a distance of eight or ten feet from the same light. The best plan, however, is to place a screen between the light and the worktable and handle the paper in its shadow except when it is in the frame and being exposed close to the light.

**Choosing a Paper.**— Any of the advertised makes of gaslight paper will be found reliable if handled exactly as the maker directs. Most are made in three grades, but a few in two only. Each grade is generally offered in a number of surfaces, glossy, semi-matt or velvet, matt, rough, etc. The most generally useful surface for small prints is the velvet, which has a slight but not unpleasant sheen and brings out almost as much detail as the glossy or enameled surface. Procure the contrast or hard grade for your thin negatives which have not sufficient contrast between the highlights and the shadows (underexposed and underdeveloped); the normal for good average negatives, and the soft for hard, contrasty (overdeveloped) negatives.

**Opening the Paper.**— Daylight or strong artificial light must not be allowed to fall on the surface of the paper until it is exposed behind the negative. Open the paper in the shadow of your screen (unless orange light is used). It will be found wrapped in black paper. The coating has a tendency to pull



the paper into a curve, with the emulsion on the concave side; but in case of doubt you can tell at once by biting a corner between your teeth, which will stick slightly to the gelatine coating. This is the only infallible test. Avoid touching the surface with the fingers.

**Loading.**— The negative is put into the frame dull side upward and the emulsion side of the paper put down upon it. The paper may be dusted before putting it into the frame to prevent white spots. Fasten the back of the frame and expose.

**Exposing.**— The time of exposure must be found by experiment. Hold the frame directly opposite the light at a distance equal to the diagonal of the negative, that is, about 7 inches for a 4 x 5, 10 for a 5 x 7, etc. If the frame is brought too close to the light, the middle of the picture will receive more exposure than the edges and come out too dark as compared with the corners. It is advisable always to print at exactly the same distance from the light. A handy wrinkle is to tie a string to the light fixture and tie a knot in it at the right distance. Then the string can be pulled taut and the frame brought up to the knot. Other plans will suggest themselves to the reader to suit his own arrangement of apparatus. The importance of uniform distance is evident when one remembers that an exposure made at double the distance takes not twice but four times as long; the law is, exposure varies as the square of the distance.

**Guide to Exposure.**— The best guide to correct exposure is found in the direction sheet which comes with the paper. The maker states the correct time of development for his formula at ordinary temperatures. Thus, a certain make may need 15 seconds, another 45 seconds; but, whatever the time, a proper exposure will reach full strength in that time and pause without growing darker. If, now, the print

is too hard or too soft to suit, the only way to get a better result is to choose a different grade of paper for the next trial. In any case, *read every word of the direction sheet several times before beginning work.* A sheet of paper cut into strips and used for finding the best exposure is the truest economy.

**Developing.**—The exposed paper is taken from the frame and immersed face upward in the developer. Have the solution about half an inch deep in the tray, hold the paper slanting, plunge one edge into the developer and push the sheet under, at once turning it over and back to break up any air bubbles — but if the procedure is properly carried out there will not be any. The image soon appears on the surface and rapidly darkens until it is strong enough. An underexposed sheet will not reach full strength in the right time and had better be thrown away, as if left in too long it will stain yellow all over or begin to turn gray in the whites. The latitude, or permissible variation of exposure, is very small with gaslight papers. Overtimed paper develops quickly and blackens too much. If the developer contains too much bromide the print will have a sickly greenish or brownish tone, no matter how quickly one snatches it out. Success, therefore, depends on getting the exposure exactly right.

**Rinsing.**—The moment the print has become dark enough, it must be taken from the developer and rinsed either in plain water or weak acid. In the latter case, if the room is lighted with a safe orange illumination, the print may remain in the acid until a number have accumulated, as the developer is “killed” by the acid. If the light is not orange, remove the print at once to the acid fixing bath. A short rinse, just enough to remove most of the alkaline developer, is all that is needed.

**Fixing.**—D.O.P. should invariably be fixed in a fresh, strong acid hypo. The acid fixers sold for

paper are reliable, or the user can mix his own from the formula in the direction sheet. Good, permanent prints can be made only by using a fresh bath for each lot of prints. The print should be submerged at once and completely. A glass filter funnel, stem up, is handy; or a stick can be used. Avoid putting your fingers into the hypo, and, in any case, rinse them in clear water and dry them on a clean towel before touching another sheet of paper. The slightest trace of hypo splattered or carried into the developer will produce spots and stains. Every time you put another print into the hypo, move the others around with the stick. Don't let them float up to the surface. After the first print has been in for ten minutes, turn all face down and continue putting prints in face up for another ten minutes. Then remove the first lot to a tray of clear water. Too long fixing may lead to a brownish tone in the middle tints of the print unless the bath is kept cold with ice. Some makers say that ten minutes is long enough for single-weight and twenty minutes for double-weight paper; but the time given will be found satisfactory.

Working in orange light and using the acid short stop (one ounce of acetic acid to the quart of water; frequently renewed, if many prints are making), one can leave the fixing to be done at the end of the printing. This is a good plan, as one can keep the prints moving and separated thoroughly for ten to twenty minutes and is then sure that they will be completely and evenly fixed.

**Washing.**—Complete removal of hypo is essential if the prints are to remain unaltered for a reasonable time. A picture on D.O.P. should be as permanent as a negative. A troublesome but effective way is to give twelve five-minute changes in two trays. Any method of washing, to be effective, must keep the prints well separated and not let



them lie at the bottom of the dish in a pool of hypo solution which has washed out and settled. There are several very good automatic washers on the market. The writer uses two Ingento washers of different sizes and finds that they do the work of eliminating hypo in half an hour. The washer must be large enough to allow the prints to revolve freely all the time. One designed for 4 x 5 prints will not work well with 4 x 6 paper, for example. If the family washbowl is the only utensil available for use with running water, take out the prints every ten minutes, drain the bowl, and refill; also keep handling them over all the time. A piece of stout rubber tubing attached to the faucet, stoppered at the other end, and pierced with holes, can often be adjusted so as to keep the prints moving and separated. The same idea can be applied to a tray or a tank.

**Hypo Test.**— The test for elimination of hypo is as follows:

Potassium permanganate.....	2 grains
Potassium carbonate.....	20 grains
Distilled water to.....	40 ounces

Take a little of this solution in a clean graduate and hold the prints so that they will drip into it. If the pink color is discharged and replaced by a greenish-yellow or a brown coloration, hypo is present, and the washing should be continued until the drippings no longer cause any alteration in the permanganate solution.

**Cleaning.**— When the prints come from the washing water, dirt will invariably be found on them. Stack them face up on a sheet of glass and clean them one by one with a tuft of absorbent cotton. You will be surprised to see how much dirt there is on them.

**Drying.**— Well-hardened prints can be dried between blotters under pressure in a hot place. A roll is best. Procure a large pasteboard mailing tube and wind good lintless photographic blotting paper around it, laying the prints face up. This of course makes them curl inward; but, on being removed from the roll, they will lie flat when they are thoroughly dry.

A simpler method of drying is to lay the cleaned prints face down on cheesecloth stretchers. They will curl somewhat when dry, and should then be evenly moistened on the backs and placed between blotters under pressure until quite dry.

**Straightening.**— Curled prints can be straightened when dry by laying them on any hard, smooth surface and drawing them gently under a straight edge. If they are given a marked curl in the wrong direction, they straighten out nicely on being put under pressure for a short time.

**Finishing.**— The mounting of D.O.P. is carried out just as with gelatine P.O.P. The glossy kind can be squeegeed in the same manner on ferrotype plates.

Defects, such as white spots, are easily touched out with a fine sable brush and a set of spotting colors.

**Redevelopment.**— The image of a black-and-white gaslight print consists of pure metallic silver in gelatine. The picture can be turned into a beautiful sepia by converting the silver to silver sulphide. The process consists of two steps, bleaching and redeveloping.

**Bleaching.**— The bleaching formula is:

Potassium ferricyanide.....	100 grains
Potassium bromide .....	100 grains
Water to .....	10 ounces

The well-washed black print is put into this bath

and left until all traces of black have disappeared from the deepest shadows.

**Redeveloping.**— The print is then rinsed and put into the sulphide bath, in which the image redevelops to a rich sepia.

Hot water .....	15 ounces
Sodium sulphide (not sulphite) .....	3 ounces

Boil ten minutes, filter, and add

Water to .....	25 ounces
----------------	-----------

To redevelop, take 1 ounce of this stock to from 12 to 20 ounces of water. Finally wash well.

Redevelopment should never be done in a room where sensitive materials are kept, as the sulphide fumes will spoil plates and papers very quickly.

**Hypo-Alum Toning.**— A method of sepia toning which gives purplish-brown tones is to treat the black prints in a bath containing precipitated sulphur. Used cold, it tones in several hours; used hot, in a few minutes. A suitable formula is:

Hypo .....	5 ounces
Powdered alum .....	1 ounce
Boiling water .....	70 ounces

This bath is milky and must not be filtered. It should be “ripened” by putting in a few spoiled prints or adding a few grains of silver nitrate and common salt. The older it gets, the better it works, if kept up to the original bulk by adding water and fresh bath from time to time.

**Control of Contrast.**— Both of these toning processes reduce the contrast of the prints, so they are best fitted to pictures of considerable vigor. A soft, well-balanced black-and-white picture seldom looks well when redeveloped.

**Control of Color.**— The color of the original print controls the shade of the resulting sepia. For sul-

phide toning, use as little bromide as possible — just enough to hold the highlights clear and give a blue-black deposit. For hypo-alum, use more of bromide, as a warm-black original gives the finest tone.

There are, naturally, many modifications of these formulas issued by different makers to suit their own papers; but the reader will find them fully covered in the manuals which they furnish on request to users of their goods. Space will not permit treating them here.

**Bromide Printing.**— Although bromide paper is used mostly for enlarging, it can be used for contact printing in much the same manner as gaslight paper. It needs rather a stronger negative. In fact, a good print can often be turned out on bromide from a negative too hard for any grade of gaslight paper.

**Exposing.**— The exposure for bromide paper is very short. One or two matches burned about three feet from the frame is often sufficient illumination for an average negative.

**Developing.**— The developer is used only about half as strong as for gaslight paper. The image appears in about a minute and is not completely developed in the lights until another minute has passed. As the paper tends to softness, brilliant results can be obtained only by giving short exposure and using the normal developer. Soft, gray prints, with a lovely pearly quality, are secured by overexposing about four times and developing with double or triple the usual amount of water and plenty of bromide. In other respects, it is handled just like gaslight paper.

## FORMULAS

**Metol-Hydrochinon.**— Makers' formulas are always safe, for some papers need a very strong bath and others would be spoiled unless they were treated in a weaker solution. A good average formula has been given by E. J. Wall.

Metol.....	25 grains
Sodium sulphite, anhydrous.....	350 grains
Sodium carbonate, dry granular.....	260 grains
Hydrochinon.....	36 grains
Water.....	16 ounces

This can be used for negatives by diluting with an equal quantity of water. For papers, take 1 part of solution, 3 parts of water, and add 10 minims of potassium bromide 10 per cent solution for each 8 ounces of diluted developer.

**Bromide Solution.**— A 10 per cent solution of bromide is:

Potassium bromide.....	48 grains
Water to.....	1 ounce

Each minim (drop) contains  $\frac{1}{10}$  grain. A saturated (65 per cent) solution is:

Potassium bromide.....	312 grains
Water to.....	1 ounce

Each minim contains 0.65 grain.

**Amidol for Gaslight Paper.**— The writer has tried many formulas and prefers the following where rich, blue-black prints are desired. Overexposure gives disagreeable greenish tones. The developer must be prepared at the time of use.

Water to make.....	10 ounces
Sodium sulphite, anhydrous.....	250 grains
Amidol.....	50 grains
Potassium bromide.....	2 grains

Use full strength for hard-working papers. Dilute with an equal volume of water for soft-working papers.

**Amidol for Bromide Papers.**— Strong, rich prints on bromide papers can be obtained with the following:

Water to make.....	20 ounces
Sodium sulphite, anhydrous.....	325 grains
Amidol .....	50 grains
Potassium bromide .....	10 grains

The same formula, with more water, yields pure black to gray prints.

**A Universal Developer.**— The writer has worked out the following two-solution duratol-hydrochinon for general use on films, plates, and all kinds of D.O.P.

A.— Water to make .....	32 ounces
Potassium metabisulphite.....	60 grains

Dissolve and add

Duratol .....	30 grains
Hydrochinon.....	90 grains
B.— Water to make.....	32 ounces
Sodium sulphite, anhydrous .....	1½ ounces
Sodium carbonate, dry granular.....	2 ounces

For gaslight papers and films, equal parts of A and B, with bromide only if necessary to keep the whites clear.

For plates and bromide paper, 1 A, 1 B, 2 water.

For tank development, 16 to 24 minutes at 65 degrees Fahrenheit, 1 A, 1 B, 4 water.

The proportions of this developer are properly balanced and should not be altered except to use more or less water. It gives good results at all temperatures from 40 to 80, and has some very definite advantages possessed by no other combination. Among them are: less tendency to fog or stain, fuller range of gradation, and greater control.



It develops papers slowly and therefore allows more latitude in exposure than the faster-working M.-Q.

**Acid Hypo.**— One of the best acid hypo baths is the simplest of all. Either potassium metabisulphite or sodium bisulphite can be used as the acid clearer and hardener.

Water (warm) .....	64 ounces
Hypo .....	16 ounces

Dissolve and add

Water (cool) .....	16 ounces
Potassium metabisulphite.....	1 to 2 ounces

or

Water.....	16 ounces
Sodium bisulphite, granular.....	1 to 1½ ounces
(or Lumière's liquid).....	2 to 3 ounces

If excessive hardening action is required in hot weather,  $\frac{1}{2}$  ounce of powdered potassium alum can be dissolved in the hardener before adding it to the hypo. Chrome alum can be used if preferred.

# NOSLIP PRINTING MASK

(PATENTED)

FOR PRINTING FILM NEGATIVES



**T**HE NOSLIP PRINTING MASK is the latest improvement in printing masks. It does away entirely with the slipping of the negative when placing the paper in position in the printing frame which frequently occurs with all of the old-style masks. It does away with all bad and ill-shaped edges, leaving a neat even white border all around the print. This mask has pockets in the four corners into which the film is slipped. Full directions with each set of masks. Each set consists of three masks, one for postcards and one each with oval and square opening the size of the negative film.

## PRICES

- |        |  |                 |
|--------|--|-----------------|
| No. 1. | For $2\frac{1}{4} \times 3\frac{1}{4}$ Film Negative, per set... | \$0.50 Postpaid |
| No. 2. | For $2\frac{1}{2} \times 4\frac{1}{4}$ Film Negative, per set... | .50 "           |
| No. 3. | For $3\frac{1}{4} \times 4\frac{1}{4}$ Film Negative, per set... | .50 "           |
| No. 4. | For $3\frac{1}{4} \times 5\frac{1}{2}$ Film Negative, per set... | .50 "           |
| No. 5. | For $4 \times 5$ Film Negative, per set...                       | .50 "           |

**GEORGE MURPHY, Inc., Retail Department**  
57 East Ninth Street, New York

*Send for New Tariff Changed No. 14 Mail-Order Cash Catalogue*



# *Home Portraiture*

---

is one of the most attractive possibilities of amateur photography. The best way to insure good results is to equip your camera with a

## **Bausch & Lomb-Zeiss Tessar Ic**

This wonderful lens is ideal for home portraiture because of its remarkable speed (f:4.5) and its covering power. It is about *three times as fast* as the ordinary lens and invaluable for exposures under weak light in the house.

New photographic catalog on application at your dealer, or free on request to us.

---

**BAUSCH & LOMB OPTICAL CO.**  
630 ST. PAUL STREET - ROCHESTER, N. Y.  
New York Washington Chicago San Francisco

# American Photography

OFFERS every camera user

Sound, practical, helpful articles;

Fine, inspiring pictures;

Plain, common-sense editorials.

Through its departments it gives direct help  
in every problem.

OUR PORTFOLIO has been famous for years  
for its reproductions and criticisms.

THE ROUND WORLD EXCHANGE CLUB  
helps you to obtain pictures by other  
workers.

THE EXPOSURE-GUIDE tells you just how  
much time to give every subject.

THE MARKET-PLACE helps you sell your  
pictures to publishers, and the others are  
equally valuable.

THE MONTHLY PRIZE COMPETITIONS  
offer incentive to improve your work.  
Prizes of \$7.50, \$5.00 and \$2.50 in photo-  
graphic supplies are awarded each month.

\$1.50 a year; three months' trial, 25 cents.

*Send a postal for a free sample copy*

---

## American Photography

221 Columbus Ave., Boston, Massachusetts



## PAPERS

**P. O. P.** A printing-out paper very simple to work, produces beautiful rich tones by the use of hypo only. 4 grades.

**S. C. P.** Known as the "Queen of Gaslight Papers." Has a wide latitude in exposure and development and produces prints of great beauty. 4 grades.

**Bromide.** The "Standard Bromide of the World." Made under the most scientific conditions and highest grade material insuring uniformity in quality and speed. 15 grades.

*Price list of Wellington Plates, Papers and  
Films sent on request.*

SOLE UNITED STATES AGENTS

**RALPH HARRIS & COMPANY**  
26-30 BROMFIELD ST., BOSTON, MASS.  
New York Salesrooms : 108 FULTON ST.

# AMERICAN PHOTOGRAPHY HANDBOOKS

*Price 10 cents each, postpaid*

1. **Retouching for Amateurs.** Elementary instructions on removing defects in negatives, and improving your home portraits. New edition, revised and enlarged, with new illustrations.
2. **The Secret of Exposure.** A simple, yet comprehensive and complete exposition of the exposure problem, with tables, illustrations of typical subjects, and notes on actinometers.
3. **How to Take Portraits.** Describes the making of background and apparatus, lighting, posing, exposure and development of home portraits, indoors and out.
4. **How to Make Enlargements.** Simple directions for making enlargements with special apparatus, and instructions for making an enlarging lantern and a fixed-focus enlarger.
5. **A Manual of Photography.** A first book for the beginner, but valuable to everybody, because written out of long experience. New, revised edition.
6. **Practical Development.** An up-to-date treatise on all the phases of this perplexing subject. Describes the construction of developers and their action under all circumstances.
7. **How to Make Good Prints.** The manipulation of the simpler processes, blue-print, printing-out, and development papers.
8. **Hints on Composition.** Some simple considerations of elementary principles of picture construction.
9. **How to Make Lanternslides.** Full and simple directions for slide making by contact printing.

AMERICAN PHOTOGRAPHY  
221 COLUMBUS AVENUE, BOSTON, MASS.

# How About You?

THOUSANDS of amateurs have accepted our SPECIAL TRIAL OFFERS becoming users and boosters of our unequalled gaslight papers. Why not secure *professional results* combined with simplicity of manipulation? YOU SAVE a great deal because you buy DIRECT FROM OUR FACTORY PREPAID. Quick to print—extreme latitude—brilliancy with detail.



"INSTANTO TRIAL OFFER"—SEND 25c FOR THREE DOZEN 4 x 6 OR POSTALS—CHOICE OF SEMI-MATTE, GLOSS OR DEAD-MATTE SURFACES. HARD, SOFT OR EXTRA HARD GRADES.



"PLATORA TRIAL OFFER"—SEND 50c FOR THREE DOZEN 4 x 6 OR POSTALS, ASSORTED GRADES—INCLUDING LINEN SURFACE.

IMPORTANT NOTICE—Either or both offers can be accepted, but not more than once. Full instructions, prices, etc., will be sent.

**FROM FACTORY  
TO YOU  
PREPAID**

**The Photo Products Co.**

(Dept. R)

6100 LaSalle St., Chicago

**ORDERS SHIPPED  
SAME DAY  
RECEIVED**

# The Photo-Beacon Exposure-Card

is the most convenient and practical help in determining the correct exposure for any subject.

The new edition (Seventieth Thousand) has been carefully revised to include all the films and plates on the American market. In every instance the speed has been determined by scientific tests by a renowned expert.

The Card assigns to each factor concerned in exposure — subject, stop, light, hour and plate — a number. These are found in the tables and added. No multiplication is necessary. The sum is then looked out on a final table, and opposite this number is found the exposure in fractions of a second, minutes or hours.

## *The Card is Absolutely Reliable*

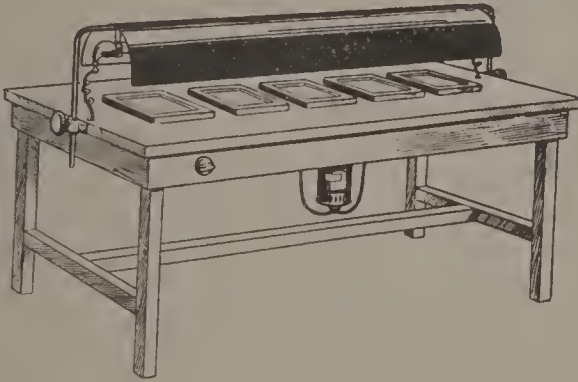
and will save its cost (25 cents) on the first roll of film or box of plates. Thousands of experienced advanced photographers depend on it for all their exposures, indoors and out.

Ask your dealer for it or send 25 cents to the publishers

**AMERICAN PHOTOGRAPHY**  
221 Columbus Avenue, Boston, Mass.



# All Sorts of Cooper Hewitt Electric Lamps for All Sorts of Printing



An outfit for Platinum Printing. Gives rapid and uniform prints. No waste due to over and under exposure. No loss because of moisture.

*"Indispensable where efficiency in printing is concerned." — Frank Scott Clark.*

Other outfits described, Bulletin 49-c.

## Cooper Hewitt Electric Company

8th and Grand Streets, Hoboken, N. J.

Boston, 161 Summer St.; Chicago, 215 Fisher Bldg.; Cincinnati, First National Bank Bldg.; Cleveland, Engineers Bldg.; Detroit, Ford Bldg.; Minneapolis, Metropolitan Life Bldg.; Philadelphia, 124 S. 8th St.; Pittsburgh, Westinghouse Bldg.; St. Louis, Central Nat. Bank Bldg.

# Popular Photography

**"THE MAGAZINE THAT  
SHOWS YOU HOW"**

A photographic magazine which publishes the short, practical articles which the average amateur wants. Nothing advanced or beyond the understanding of the worker who does not care to go deeply into photographic processes but who does wish to get the best possible results from every exposure. The magazine is well illustrated with sharp, clear photographs, all of which are fully described and criticized, with suggestions for improvement. Hundreds have said that it is just what they were waiting for: so will you, when you see a copy.

## ***NO FREE SAMPLE COPIES***

SINGLE COPIES.....10 CENTS  
YEARLY SUBSCRIPTION.....ONE DOLLAR  
FOUR MONTHS' TRIAL .....25 CENTS

---

**POPULAR PHOTOGRAPHY**

**221 Columbus Avenue**

**Boston, Mass.**

# New York Camera Exchange

109 FULTON STREET - NEW YORK

---

*Are we acquainted? If  
not we both lose money*

The Original Exchange House.  
Established 1890.

We buy, sell and exchange  
Cameras and Lenses.

Bargains always on hand.

If you are thinking of getting  
a new lens or camera, let us  
help you.

Agents for all makes of Cam-  
eras and Lenses.

Send for our new bargain list.

---

J. H. ANDREWS - - Proprietor

*A Universal Developer for Plates  
Films and Paper*

# EASTMAN SPECIAL DEVELOPER

Gives both negatives and prints of perfect quality, does not stain the fingers, is economical and convenient.

*An Ideal Developer for Velox*

## THE PRICE

Carton of five glass tubes.....\$.25

Carton of six powders..... .25

**EASTMAN KODAK COMPANY**  
**ROCHESTER, N. Y.**

*At your dealer's*

*Good negatives and good prints depend upon proper fixing as well as proper development. Be sure of your results — insist on having*

# KODAK Acid Fixing Powder

It contains the necessary amount of the proper chemicals to keep the film or paper hard and firm during fixing and washing, to prevent staining and to insure permanency of results if used according to instructions.

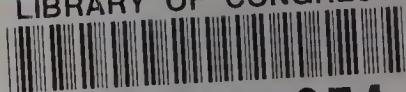
Kodak Acid Fixing Powder is made with special regard to its use with Kodak film and Velox and other developing-out papers. It is right for the purpose — is an important link in the simple, certain Kodak way of picture making.

*Look for the seal  
on the package*



Eastman Kodak Co., Rochester, N. Y.

LIBRARY OF CONGRESS



0 040 055 354 3



## Prints by Gaslight

FOR THAT BEST POSSIBLE PRINT:

# VELOX

One of the grades of Velox will make the best possible print from each of your negatives.

It fits because it is made with special regard to amateur requirements—is the amateur's own paper.

The "Velox Book," a complete illustrated manual on Velox printing, is free at your dealer's, or by mail.

NEPERA DIVISION  
EASTMAN KODAK COMPANY  
ROCHESTER, N. Y.

At your dealer's